DOCUMENT RESUME

ED 368 359 IR 054 891

AUTHOR Noguchi, Kay
TITLE Internet 101.
INSTITUTION Pacific Region Educational Lab., Honolulu, HI.
SPONS AGENCY Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE Nov 93
CONTRACT RP91002009
NOTE 7p.
AVAILABLE FROM Pacific Region Educational Laboratory (PREL) Publications, 828 Fort Street Mall, Suite 500, Honolulu, HI 96813.
PUB TYPE Guides - Non-Classroom Use (055) -- Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Access to Information; *Computer Networks; *Educational Technology; Electronic Mail; Elementary Secondary Education; Higher Education; *Information Networks; Information Technology; *Technological Advancement; *Telecommunications
IDENTIFIERS Hawaii; *Internet; *Pacific Region; PEACESAT

ABSTRACT

The Internet, a worldwide network of computer networks, is a noncommercial service with acceptable use restricted to the advancement of education and research. Although it has been in existence for quite a while, it is still new to most elementary and secondary educators in the Pacific region and elsewhere. This report is an introduction to the Internet and global networking. Pacific-region education faculty have access to the Internet through the University of Guam and the University of Hawaii and will soon have access through the PEACESAT (Pacific Educational And Communication Experiment by SATellite) project, a partner with the Pacific Region Educational Laboratory. Basic Internet applications are described, including electronic mail, remote login, and file transfer. Real life examples are given of the ways in which elementary and secondary school teachers can use the Internet. These include professional use by teachers and use by students in discussion groups through electronic mail. Prerequisites for Internet use are described. (Contains 16 references.) (SLD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 368 359

IR

PACIFIC REGION EDUCATIONAL LABORATORY

828 Fort Street Mall ◆ Suite 500 ◆ Honolulu, Hawaii 96813

A nonprofit corporation for educational research and improvement, serving Pacific children and educators in ◆ American Samoa ◆ Commonwealth of the Northern Mariana Islands ◆ Federated States of Micronesia: Chuuk, Kosrae, Pohnpei, Yap ◆ Guam ◆ Hawaii ◆ Republic of the Marshall Islands ◆ Republic of Palau

Internet 101

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

by Kay Noguchi
Resource Center Specialist

Welcome to "Internet 101," a brief introduction for Pacific educators to the wonders of global networking. The Internet, a worldwide network of computer networks, is a non-commercial service with acceptable use restricted to the advancement of education and research. Although the Internet has been around for a while, it is still new to most K-12 educators in the Pacific and elsewhere. According to a recent U.S. survey conducted by the Center for Technology in Education, "...the use of the Internet is not yet a widespread or common practice among educators in the K-12 community; only half our technologically sophisticated respondents report having access to the Internet..." (Honey, 1993).

"Internet 101" is intended to interest you in exploring on the Internet, sometimes called the "information highway." You will need a computer with a modem, communications software, a telephone line, and access to the Internet. If you are not equipped for this journey, come along as an armchair traveler. You may want to start preparing for a future Internet visit—perhaps to exchange lesson plans with other teachers, or to search a database of successful school practices, or to consult with researchers available to advise practitioners, or to involve your class in an international project with students in other countries, or to... The Internet is becoming accessible to Pacific educators, and users will find that appropriate content and applications for K-12 education are on the rise.

Internet Access in the Pacific

- University of Guam, University of Hawaii
- Hawaii FYI/Portal
- Hawaii Department of Education
- PEACESAT

Pacific education faculty have access to the Internet through the University of Guam and the University of Hawaii. Anyone in Hawaii can achieve access to the Internet by subscribing to the Portal Online Communications System through Hawaii FYI. (There is a $40 monthly charge for unlimited online use.)

During this 1993-94 school year, the Hawaii Department of Education (DOE) is pilot testing a project that provides students access to the Internet. Teachers already involved with telecommunication activities volunteered for the project. Over the summer, 25 teachers participated in a 96-hour course on the use of the Internet for K-12 education. The course and the pilot project were developed in a partnership between the DOE and the University of Hawaii Computing Center. There are now 33 teachers involved, and some 1,000 users will participate in the pilot test over the course of the school year. The project will identify and evaluate available resources on the Internet that can provide research opportunities to students. It will also design a menu for accessing appropriate resources. (Arakaki, 1993)

The important news for the Pacific is that PEACESAT (Pan Pacific Education and Communications Experiments by Satellite) installed their Internet-connected computer over the summer. They are now in the process of developing policies and procedures for Internet access through PEACESAT, to be followed by training. PEACESAT has been a key partner of the Pacific Region Educational Laboratory (PREL) since November 1991 when the first teleconference of Pacific school improvement trainers was held. Now, through subsidized Internet access via PEACESAT, PREL anticipates another advancement in communication within the Pacific region.

IR 054 071

BEST COPY AVAILABLE

Importance for the Pacific

- Overcoming the tyranny of distance
- Access to information

In an appropriately titled article—"Surfing the Internet"—the author identifies the significance of Internet access in the Pacific: "Telecommunications helps us overcome what has been called the tyranny of distance" (Polly, 1992). Pacific Islanders are well aware of the tyranny of distance. Hawaii is the most isolated spot on earth and one of the most costly places to live, due in part to shipping expenses for fuel, food, and other goods. Travel between the Pacific Islands or to anywhere else involves great distances and high costs. For example, the round trip from Palau to Washington, D.C. is 18,950 miles, requiring more than 40 hours of travel time.

Many of the small islands in Micronesia are connected to the rest of the world by ships or boats which may or may not arrive on schedule due to ocean conditions. A further tyranny is time differences that limit telephone communication. When it is noon on Friday in Honolulu, it is already 6 p.m. on the East Coast of the U.S. and 9 a.m. Saturday in Pohnpei. There is good reason to explore a technology that can help overcome the tyranny of distance in the Pacific region.

There is another area of great potential for the Pacific through Internet: access to information. The American affiliates in the Pacific have not shared in the information glut available in the American states. Now, through telecommunications, people the world over can more or less start on a level playing field:

> The information age is characterized by increased access to databases, libraries, resource people, and materials that were previously inaccessible. For example, through the various networks, students can gain electronic access to newspapers, encyclopedias, weather information, space databases, humanities journals, and much more. In a real sense, computer networking makes the information of the world available in the local school and even in the individual classroom or library media center. (Eisenberg, 1993)

What Is the Internet?

- Worldwide network of computer networks
- Linked by Transmission Control Protocol/Internet Protocol
- Non-commercial, for education and research

The Internet—a worldwide network of computer networks—has been described as "the largest machine ever made by man" (Lynch, 1993). It is growing so rapidly that it is difficult to keep track of its size. Current estimates are that the Internet connects some 11,000 existing computer networks (Broad, 1993) in 45 nations, linking some 1.5 million computers used by millions of people—most of whom are fairly new to the Internet. In 1989 there were only 80,000 computers registered on the Internet but by October 1990 there were 313,000 (Lottor, 1992). The exponential growth of the Internet is a phenomenon of the 1990s.

The networks are connected to each other in a variety of ways including regular phone lines, dedicated leased lines, satellites, microwave links, packet radio, and fiber optic cables. To make it work, the participating networks must agree on how they will communicate with each other. The Transmission Control Protocol/Internet Protocol (TCP/IP) is the "foundation on which the Internet is built. Basically, it is the software that enables dissimilar computers, from massive IBM mainframes and supercomputers to workstations and small personal computers, to communicate with each other" (Nickerson, 1991).

The Internet is a non-commercial network of computer networks with acceptable use restricted to the advancement of education and research. There are a number of other worldwide networks that use different protocols than TCP/IP and provide their own services. The one basic Internet service that is available to all is electronic mail, or "e-mail." Users of commercial services like Compuserve, BITNET, and America OnLine can send and receive e-mail via the Internet.

The Internet: Past, Present, and Future

- ARPANET, first packet-switching network
- NSFNET, backbone of the Internet
- NREN, national public network

Back in the sixties, computers were enormous. They resided in their own special climate-controlled rooms and were fed data from reels of punched paper tape or stacks of punched cards. The equipment was costly, but clearly indispensable to advanced research. The first network ever developed was used to connect organizations involved in government-sponsored research in computing. The Defense Advanced Research Projects Agency (DARPA) of the Department of Defense funded the development of the first successful prototype packet-switching network, known as ARPANET, in 1969 (Bishop, 1990).

What is a packet-switching network? The TCP/IP breaks up information into smaller "packets," each of which also contains information on its place in the sequence as well as on the sender and receiver. These packets are sent out over the network and can travel by a variety of routes; the computers that switch the packets are called "routers," and

they are programmed to select the best route. So the various packets may arrive along different routes, but they arrive together and are put in proper sequence at the receiving end. Like ARPANET, Internet is a packet-switching network.

In the mid-1980s, the National Science Foundation (NSF) decided to fund about five supercomputers for scientists. This development caused a "meltdown" of the existing network and led to the creation of NSFNET, which is the primary "backbone" of the Internet in the U.S. (Lynch, 1993). The NSFNET is comprised of some 27 sites that have regional networks (e.g., BARRNET in the San Francisco area, CERFnet in Southern California, NEARnet in six states in the U.S. Northeast, NorthWestNet in seven states in the U.S. Northwest). Also in the mid-1980s, national networks similar to the NSFNET were becoming operational in other nations and connecting to the U.S.

There is every reason to believe that these next few years will be dynamic and explosive for networking improvements and applications. In December 1991, then-President George Bush signed into law the "High-Performance Computing Act of 1991," a bill sponsored by then-Senator (now Vice-president) Al Gore. This is enabling legislation for the creation of a high-speed, high-capacity network—the National Research and Education Network (NREN)—to replace the NSFNET (which is now referred to as the "Interim NREN"). Where networking was once the province of academia and research laboratories, the NREN will be the basis of a national public network. There are tremendous opportunities ahead for K-12 applications, some pioneering examples of which are shared later in this paper.

The Basic Internet Applications

- E-mail
- Remote login
- File transfer

Probably the most well known use of networking is electronic mail or e-mail. Within e-mail there are three major categories: correspondence, discussions, and journals.

For correspondence, e-mail is fast, easy, and inexpensive. The ease and informality of e-mail means that you can write a note to someone in a fraction of the time it would take to type a letter and envelope, and get it stamped and mailed. Unlike a fax transmission, a document transmitted by e-mail can be manipulated, edited, and printed at will (Tennant, April 1992). With e-mail, you can send a message out at your convenience (no worries about different time zones or slow deliveries) and your recipient can read it at their convenience.

An elaboration of e-mail is to use it for round-robin communication among a group of people. Mail sent to the group address is distributed to all "subscribers." (Subscriptions are free.) These groups are known as mailing lists, discussion groups, reflectors, aliases, or listservs, depending on what type they are and how they are driven (Polly, 1992). For a smaller group, this might replace or supplement teleconferencing. For a larger group, it affords the opportunity for year-round networking, perhaps between annual conferences.

Another variation of e-mail is electronic publishing, or e-journals. This is a new and burgeoning field. Already there are 15-20 refereed journals on the Internet (Okerson, 1993). Authors are also using e-mail to send out "preprints" of journal articles for feedback which is responsive, immediate, and interactive.

These e-mail applications have tremendous ramifications for the way we solve problems. Knowledge was once rather rarefied. An author had to know enough about a subject to write an entire book or journal article, which may or may not have found its way into print. Then, depending on how the book or article was cataloged and indexed, a user may have been able to seek out the answer to a specific question from the body of published knowledge. Now a person with a question can go to an appropriate listserv and ask for help, answers, or suggestions from a worldwide network of Internet users. This is revolutionary. Or, put more conservatively, "Internet users often find that the expanded capability to communicate with colleagues around the world leads to important new sources of information, collaboration, and professional development" (Tennant, October 1992).

In addition to e-mail, there are two other basic Internet applications: remote login and file transfer. Within TCP/IP, remote login is referred to as Telnet. Sitting at a computer in the PREL office in Honolulu, for example, an Internet user can go online to a computer halfway around the world. Using Telnet, one can establish connections with a multitude of bibliographic databases (primarily library catalogs), campus information systems of various universities, full-text databases, data files (e.g., statistics, oceanographic data, meteorologic data, geographic data, etc.), and other online services (Tennant, October 1992).

File transfer is the capability to connect your computer to a remote computer and transfer files using the File Transfer Protocol (FTP) of TCP/IP. Types of files that can be transferred using FTP include virtually every kind of file that can be stored on a computer: text files, software programs, graphic images, sounds, files formatted for particular software programs (e.g., files with word processing formatting instructions), and others (Tennant, October 1992). A beautiful marriage of new technology and classic resources is the work of Project Gutenberg. This volunteer group is preserving uncopyrighted texts in full for online file transfer. If you so choose, for example, you may FTP the Bible.

Networking and K-12 Education: Real-life Examples

Educators and students are finding their way onto the Internet. In this time of school reform and restructuring, K-12 educators are confronting challenges they have not faced before and are breaking new ground in seeking solutions. Electronic discussion groups will increasingly provide professional communities for educators.

Innovative lessons for students can also integrate Internet use. An example in the Pacific is SPaRCE, Schools of the Pacific Rainfall Climate Experiment. This cooperative field project involves high school and college students, teachers, and meteorologists from 25 schools and bureaus across the Pacific basin and rim. It was developed by PEACESAT, the National Oceanic and Atmospheric Administration, the NASA Oklahoma Space Grant College Consortium, and the NASA Hawaii Space Grant College. In addition to field research and monthly PEACESAT teleconferences, the project includes access via Internet to a database containing the information supplied by each of the participating sites. Other examples of K-12 Internet applications include:

> The Texas Education Network (TENET), a statewide K-12 education network with a connection to the Internet, currently links over 15,000 educators in Texas. These teachers and administrators are using the network to communicate with other educators all over the world and to access educational resources such as an online encyclopedia, the Educational Resources Information Center Documents Database (ERIC), lesson plans, study guides, current events (including daily guides such as CNN Newsroom and Stardate), and UPI news. (LaQuey, 1993)

> One of these [Internet discussion] groups allows children and young adults all over the world to communicate with each other. Kids from Cupertino to Moscow are talking about their lives, pets, families, hopes, and dreams.... Teachers exchange lesson plans and bibliographies in another group, and schools participate in projects like the global market basket survey. For this project, students researched what foods a typical family of four would buy and prepare over one week's time. Their results were posted to the global project area, where they would be compared with reports by kids from all over North and South America, India, Scandinavia, and Asia. It opened up discussions of dietary laws, staple foods, and cultural differences. (Polly, 1992)

> The FrEdMail (Free Educational Mail) Network is an informal, grassroots telecommunications network that helps teachers and students exchange information freely and simply. With over 120 nodes, it lets teachers share experiences with student assignments, distribute teaching materials and curriculum ideas, and promote the development of effective reading and writing skills. FrEdMail also allows teachers to obtain information about workshops, job opportunities, legislation affecting education. It motivates students to become better learners and writers. FrEdMail was initiated by Al Rogers, a computer specialist for San Diego County Schools. (Kehoe, 1993)

> Kids around the world caught the Olympic spirit last year as they participated in their own worldwide, "virtual" Olympics. The Academy One TeleOlympics, organized by NPTN (National Public Telecomputing Network), had more than 12,000 kids from 9 countries competing in track and field events in their own schoolyards. All of the events were held on the same day, after an opening ceremony that included a realtime chat hosted by the Cleveland FreeNet and an exchange of e-mail among all the participating schools. Events included 50-, 400-, 800-, and 1600-meter runs (for different age groups), a long jump, and a tennis ball throw. Results were posted to the network, and medalists in each event and age category shared an electronic victory platform. The teachers made the most of the accompanying educational opportunities, and the kids had fun! (Delzeit)

Many other K-12 Internet applications are currently in place, with many more on the horizon. The U.S. Department of Education is actively exploring telecommunications applications, as are the ten U.S. regional educational laboratories with support from the Department. In a joint project, the laboratories are developing databases for alternative assessment and successful practices in mathematics and science education, as well as a bibliographic database for publications from the laboratories. PREL and the educators it serves can anticipate increased dialogue and access to resources through the laboratories' networking activities.

Getting Started

The prerequisites for using the Internet are a computer with a modem and access to the network. Then patience, persistence, and practice will be helpful. Making the Internet work for you is not all that simple. To begin with, "Once you have an account, you have to learn how to use the software on that machine. You will have to know how to connect and disconnect from a terminal or personal computer; how to list, create, print, and delete files; and how to use application programs such as the local e-mail software. This is often the most difficult part for the beginner." (Nickerson, 1991)

At the same time that you are improving your technical skills on how to travel the Internet's "information highway," you also need to figure out where to go. This is also problematic. "One of the great ironies is that the best way to become aware of directories of Internet resources and of the existence of new reference sources is through the Internet itself," according to Clifford Lynch, Director, Library Automation, University of California. "One way of viewing the current problem is that there is little point in trying to explain *specific* information resources; the point is to become familiar with techniques and methodologies for identifying and accessing resources as the network continues to evolve."

One final caution to the prospective Internet traveler: allow plenty of time for the journey, as it is easy to get diverted on interesting side trips along the way. As Grant McCall of the Centre for Pacific Studies at the University of New South Wales explains, "E-mail is one of the greatest time-wasting activities ever invented by the mind of Man! It is suited especially for the ditherer, the procrastinator, and the infophiliac! For what, then, is it good and how can anyone interested in the Pacific make use of this new (since about 1967!) gizmo? E-mail is a function of a larger system of interconnected networks around the world, and serves purposes from military research to environmental activism, from adolescent dating to the works of Dante."

Paradoxically, Internet makes the world both larger and smaller. It opens up many new avenues for exploration, while closing the gaps that separate us. If "Internet 101" has piqued your interest in exploring the global network, you may wish to do further reading or you may find an experienced traveler to guide you on your journey of discovery. *Bon voyage!*

References

Arakaki, S. (1993, October 4). Interview with author.

Bishop, A. P. (1990, November). The National Research and Education Network (NREN): Promise of a new information environment (ERIC Digest EDO-IR-90-4). Syracuse, NY: ERIC Clearinghouse on Information Resources.

Broad, W. J. (1993, May 22). Internet pushing science at warp speed. Honolulu Star-Bulletin, p. A-5.

Delzeit, L. Cleveland FreeNet. Cited in LaQuey, see below.

Eisenberg, M. B. & Ely, D. P. (1993). Plugging into the 'net. The ERIC Review, 2(3), 2-10.

Honey, M. & Henriquez, A. (1993). Telecommunications and K-12 educators: Findings from a national survey. New York: Center for Technology in Education, Bank Street College of Education.

Kehoe, B. P. (1993). Zen and the art of the Internet: A beginner's guide (2nd ed.). Englewood Cliffs, NJ: PTR Prentice Hall.

LaQuey, T. & Ryer, J. C. (1993). The Internet companion: A beginner's guide to global networking. Reading, MA: Addison-Wesley.

Lottor, M. (1992, January). "Internet Growth (1981-1991); RFC1296," Network Working Group Request for Comments. Cited in LaQuey, see above.

Lynch, C. (1993, April). Internet: The electronic smorgasbord. Presentation sponsored by the Hawaiian-Pacific Chapter of the Special Libraries Association, Hawaii State Public Library System, and the Interlibrary Cooperation Council. Honolulu, HI.

McCall, G. (1993). Some advice to novice users. Pacific History Association Newsletter 29, p. 15.

Nickerson, G. (1991, September). Networked resources. Computers in Libraries, pp. 25-29.

Okerson, A. (1993, May). Scholarly publishing: A network runs through it. Presentation sponsored by the University Library and the Library Senate, University of Hawaii at Manoa. Honolulu, HI.

Polly, J. A. (1992, June). Surfing the Internet: An introduction. Wilson Library Bulletin, pp. 38-42, 155.

Tennant, R. (1992, April). Network basics. Computers in Libraries, pp. 55-57.

Tennant, R. (1992, October). Internet basics (ERIC Digest EDO-IR-92-7). Syracuse, NY: ERIC Clearinghouse on Information Resources.

PREL Publications

Available on request at no charge:

Young Children and Education in the Pacific: A Look at the Research by Alice J. Kawakami, PREL Director of Research and Development. 2 pages, November 1991.

Synthesis of the Research on Educational Change: Overview and Initiation Phase by Kathleen U. Busick, PREL Program Specialist, and Rita Hocog Inos, PREL Director of Programs and Services. 4 pages, November 1991.

Synthesis of the Research on Educational Change: Implementation Phase by Kathleen U. Busick, PREL Program Specialist, and Rita Hocog Inos, PREL Director of Programs and Services. 4 pages, October 1992.

Modified School Schedules: A Look at the Research and the Pacific by Stan Koki, PREL Senior Associate. 6 pages, November 1992.

Developing Effective Educational Partnerships: The Why, What, and How by Karen Y. Aka, PREL Program Specialist. 4 pages, June 1993.

Internet 101 by Kay P. Noguchi, PREL Resource Center Specialist. 5 pages, November 1993.

Available for $4 payable to PREL:

Pacific Private Schools Directory 1993. A listing of private schools in American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Republic of the Marshall Islands, Republic of Palau, and State of Hawaii. 32 pages, February 1993 .

Periodic publications distributed at no charge (but please send a written request to be added to the mailing list to the address below).

Pacific Education Updates. A four-page quarterly report on activities of the laboratory and other news of interest to Pacific educators.

Voyages in Mathematics and Science. A six-page bimonthly publication that includes classroom activities and puzzles as well as information related to mathematics and science education in the Pacific region.

PREL Publications
828 Fort Street Mall, Suite 500
Honolulu, HI 96813

This publication was produced for the Laboratory Network Program with funds from the Office of Educational Research and Improvement (OERI), U.S. Department of Education, under contract number RP91002009. The content does not necessarily reflect the views of OERI, the Department, or any other U.S. government agency.